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EXAMINER	
YUAN, KATHLEEN S	
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/619,943	PETERSON ET AL.	
	Examiner	Art Unit	
	Kathleen S. Yuan	2624	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *17 September 2007*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1 and 3-28* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,3-28* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

The response received on 9/17/2006 has been placed in the file and was considered by the examiner. An action on the merit follows.

Response to Amendment

1. The amendments filed on 17 September 2006 have been fully considered. Response to these amendments is provided below.

Summary of Arguments and Examiner's Response:

2. *Regarding claim 1, the applicant argues, "...Fujimori discloses comparing image data for an object to reference data to determine if there are defects on the object. However, Fujimori does not teach or suggest that the reference data is an aerial image of the object acquired at a value of a member of a set of lithographic variables that represents a reference member value. Therefore, Fujimori does not teach or suggest determining a presence of an anomaly in a design pattern of a reticle by comparing at least one pair of aerial images corresponding to at least two different values of a member of a set of lithographic variables for which the aerial images are acquired, one value of which represents a reference member value, as recited in claim 1, and cannot be combined with Shykind and Ferguson as suggested in the Office Action to overcome deficiencies contained therein." (page 10)*

3. The examiner did not state that Fujimori disclosed all the limitations on the claim; otherwise, the rejection would have been a 102 rejection. Fujimori discloses that

reference data is used to compare to input data, as disclosed in the previous office action's rejection for claim 2, showing that it is possible to have a reference value that is compared. As disclosed in the previous rejection for claim 1, Shykind discloses that the different values of a member of a set are a set of lithographic variables, and that Ferguson discloses aerial images being an advantageous way to evaluate masks. The addition of Fujimori is to illustrate and disclose it is obvious to a person of ordinary skill in the art to apply a reference value, as disclosed by Fujimori, as one of the values of Shykind and Ferguson. The examiner agrees that Fujimori does not teach the full claim, as the applicant has argued; however, in combination with all the previous references, all limitations are addressed. Fujimori can be combined with Shykind and Ferguson, as explained above and in the previous action.

4. *Regarding claim 17, the applicant argues that Shykind discloses detecting and flagging mask defects and does not disclose, "determining which of the defect areas will cause a lithography process using the mask to be most susceptible to failure. Therefore, contrary to the assertions in the Office Action, Shykind does not teach or suggest determining an area on a reticle where a lithography process using the reticle is most susceptible to failure." (page 11).*

5. The examiner would like to remind the applicant that it is the examiner's duty to take the broadest interpretation of the claim. By flagging possible defects and finding the area that the flagged defect is located, as the applicant has admitted that Shykind does disclose, Shykind is disclosing determining an area on the reticle where a lithography process using the reticle is most susceptible to failure. This is because

Shykind determines all areas that are possible defect areas, thus determining any area that is susceptible to failure, as opposed to the areas that are not flagged, which are least susceptible to failure.

6. *Regarding claim 20, the applicant argues, "First, Allan does not teach or suggest finding faults in an integrated circuit from a mask as suggested in the Office Action. In particular, Allan states that 'Algorithms are presented for extracting the critical area associated with extra and missing material soft faults of an integrated circuit from the mask layout.' (Allan -- abstract). Allan also states that 'Methods to extract the critical area of soft faults from integrated circuit mask layout have been presented...The tool has the added advantage that it can be interfaced to the Cadence layout editor [35] to allow interactive examination of device layout.' (Allan -- conclusion). As such, Allan teaches detecting areas associated with faults in a layout for an integrated circuit using a layout for a mask. However, as is known in the art, a mask layout is different than a physical mask. Therefore, Allan discloses extracting critical areas associated with soft faults in an integrated circuit layout from a mask layout for the integrated circuit, but Allan does not disclose finding hard and soft faults in an integrated circuit from a mask as suggested in the Office Action." (page 13)*

7. Even if Allan discloses a mask layout and the invention is regarding errors in a mask, Allan is still applicable because Allan is primarily focused on detecting errors, like the invention and other prior art used. Other prior art (Ferguson and Shykind) suggests detecting errors on the mask with aerial images.

8. "Second, contrary to the assertions in the Office Action, the hard and soft faults disclosed by Allan are not equivalent to transient and non-transient defects as presently claimed...Allan does not teach or suggest that such hard and soft faults are caused by non-transient or transient defects" (page 13-14)

9. The hard and soft faults of Allan are not caused by certain defects, but rather are a certain type of defect, non-transient and transient defects. In Allan, a hard fault is defined as a fault that causes a short. Thus, this is a non-transient defect because the defect is always there, causing a short. A soft fault is that of a defect where the electrical nodes' distance is reduced; this is interpreted as a transient defect because the soft fault can be a problem some of the time. Therefore, the hard and soft faults are comparable to faults of the claimed invention.

10. "Third, Allan does not teach or suggest determining soft faults by subtracting out the hard faults as suggested in the Office Action. In particular, Allan states that "The region associated with soft faults alone is generated by subtracting the hard fault critical area from this region as shown in Fig. 3(f)." (Allan -- page 148). In addition, Allan defines the critical area of the layout as the region in which a defect of size x must fall in order to cause a fault (See, for example, Allan -- page 146). Therefore, Allan discloses subtracting the hard fault critical area (the region in which a defect of a certain size must fall in order to cause a hard fault) from the soft fault critical area (the region in which a defect of a certain size must fall in order to cause a soft fault). As such, Allan teaches subtracting regions of an integrated circuit layout associated with hard faults from regions of the integrated circuit layout associated with soft faults. However,

subtracting regions associated with different kinds of faults is not equivalent to determining soft faults by subtracting out hard faults. Moreover, subtracting regions associated with different kind of faults is not equivalent in any manner to subtracting non-transient defects from aerial images. As such, contrary to the assertions in the Office Action, the combination of Shykind, Ferguson, and Allan does not teach or suggest determining a presence of transient repeating defects on a reticle by subtracting non-transient defects in aerial images of the reticle and comparing at least one pair of the aerial images corresponding to at least two different values of a member of a set of lithographic variables, as recited in claim 20." (page 14)

11. The examiner stands by the opinion that Allan discloses subtracting out hard faults/non-transient faults to obtain soft faults/transient faults. This is shown on page 147 where Allen explains the "H&S fault critical area," a region that combines hard and soft faults and illustrated in fig. 3D. Then, the hard faults are subtracted from the H&S region, as explained on page 148, paragraph 2 and 4. However, the applicant has a point about not disclosing that the transient faults are determined; only the critical area is found. Therefore, the rejection is changed and this argument is moot.

12. Regarding claim 11, the applicant argues that Sumita is non-analogous art, and that Sumita's pre-processing would not be applicable to masks.

13. Sumita is analogous art because Sumita is regarding image processing, and furthermore, defect detection. Sumita shows that it is advantageous to prefilter the image data, which teaches the limitation of the claim. The applicant argues that Sumita eliminates certain defects that may cause significant damage in the wafer. However,

the claimed invention regards defects, not a certain type of defect. One would be drawn to use this filter when finding certain defects that excludes cracks. The applicant themselves claim a way to remove non-transient defects in claim 20 in order to find another type of defect. Sumita teaches the limitations in the claim and is analogous art.

14. Regarding claim 14, the applicant argues that "Shykind does not teach or suggest binning the mask defects in any manner after they have been identified...Shykind does not disclose binning more than one anomaly according to regions of the reticle proximate the more than one anomaly."

15. Shykind teaches binning by showing that the defects are flagged. All the defects are in the same bin as being flagged as a defect. The binning is with more than one anomaly since many regions are flagged close to the defect because the possible defect region is flagged itself.

16. Regarding claim 15, the applicant argues that Shykind does not disclose determining a process window for a lithography process to be carried out using the reticle.

17. The examiner disagrees. The summary for fig. 3 is as follows, "FIG. 3 is silicon wafer configuration to detect mask defects..." and further in col. 2, lines 44-47, Shykind discloses, "each alternating die...is printed with a different process condition." Therefore, Shykind does teach the determination of a process window (on the wafer) for the lithography process to be carried out using the reticle, because the reticle is used to print on the die.

18. Regarding claim 16, the applicant argues that Allan does not disclose finding the critical status of the anomaly.

19. This argument is moot on new grounds of rejection.

20. Regarding claim 26, the applicant argues that Allan does not teach or suggest the cause of extra material defects

21. This argument is moot on new grounds of rejection.

Claim Rejections - 35 USC § 103

22. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

23. Claim 17 is rejected under 35 U.S.C. 103(a) as being unpatentable over Shykind et al in view of U.S. Patent No. 5932377 (Ferguson et al).

Regarding claim 17, Shykind et al discloses a method, comprising: acquiring images of a reticle (fig. 3) containing a design pattern by a detection circuit (fig.2, item 204), wherein the images are acquired for different values of a member of a set of lithographic variables (fig. 8, item 300), the different values of a member of a set of lithographic variables being the different process conditions such as exposure time and focus setting; comparing at least one pair of the images corresponding to at least two of the different values (fig. 8, item 806); and determining an area on the reticle where a

lithography process using the reticle is most susceptible to failure based on results of said comparing by determining the defect area, since a defect area is where the reticle is most susceptible to failure (fig. 8, item 808 and 810).

Shykind et al does not disclose expressly that the images are aerial images. Shykind et al uses images of a printed die.

Ferguson et al discloses it is advantageous to take images of a mask by using aerial images (col. 7, lines 45-47) instead of using wafer exposures.

Shykind and Ferguson et al are combinable because they are from the same field of endeavor, i.e. imaging masks.

At the time of the invention, it would have been obvious to a person of ordinary skill in the art to use an aerial image.

The suggestion/motivation for doing so would have been to provide a faster, more accurate method (col. 7, lines 51-52).

Therefore, it would have been obvious to combine the method of Shykind et al with the aerial imaging of Ferguson et al to obtain the invention as specified in claim 1.

24. Claims 20-21 and 23-26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shykind et al in view of Ferguson, and further in view of U.S. Patent No. 6665065 (Phan et al) and "Critical Area Extraction for Soft Fault Estimation" (Allan et al).

25. Regarding claim 20, Shykind et al discloses a method, comprising: inspecting a reticle containing a design pattern for defects (col. 1, lines 39-41); acquiring images of a

reticle (fig. 3) containing a design pattern by a detection circuit (fig.2, item 204), wherein the images are acquired for different values of a member of a set of lithographic variables (fig. 8, item 300), the different values of a member of a set of lithographic variables being the different process conditions such as exposure time and focus setting; comparing at least one pair of the images corresponding to at least two of the different values (fig. 8, item 806).

Shykind et al does not disclose expressly that the images are aerial images and that non-transient defects are found and determining a presence of transient repeating defects on the reticle by subtracting the non-transient defects from the aerial images.

Ferguson et al discloses it is advantageous to take images of a mask by using aerial images (col. 7, lines 45-47) instead of using wafer exposures.

Shykind and Ferguson et al are combinable because they are from the same field of endeavor, i.e. imaging masks.

At the time of the invention, it would have been obvious to a person of ordinary skill in the art to use an aerial image.

The suggestion/motivation for doing so would have been to provide a faster, more accurate method (col. 7, lines 51-52).

Shykind et al (as modified by Ferguson et al) does not disclose expressly that non-transient defects are found and determining a presence of transient repeating defects on the reticle by subtracting the non-transient defects from the aerial images.

Phan et al discloses finding/ determining the presence of hard and soft faults in a reticle, which are equivalent to transient and non-transient defects (col. 4, lines 14-16).

At the time of the invention, it would have been obvious to a person of ordinary skill in the art to find hard and soft defects.

The suggestion/motivation for doing so would have been to make a more accurate determination of the defect to show which areas are more critical (hard defects) and must be corrected.

Shykind et al (as modified by Ferguson et al and Phan et al) does not disclose expressly that soft defects are found by subtracting non-transient defects out.

Allan et al discloses finding hard and soft fault areas, which is equivalent to transient and non-transient defects areas (abstract) and determining the soft faults by subtracting out the hard faults (pg. 3, paragraph 2). Therefore, Allan et al discloses that hard and soft faults are mutually exclusive, and to find one fault, you subtract out the other type of fault.

Shykind et al (as modified by Ferguson et al and Phan et al) and Allan et al are combinable because they are from the same field of endeavor, i.e. defect detection in electronics.

At the time of the invention, it would have been obvious to a person of ordinary skill in the art to find and distinguish between soft/ hard defects by subtracting one from the other.

The suggestion/motivation for doing so would have been to provide a more robust system by allowing the differentiation between the defects in a simple, efficient manner.

Therefore, it would have been obvious to combine the method of Shykind et al with the hard/ soft defect detection of Phan et al, the subtracting of Allan et al and the aerial imaging of Ferguson et al to obtain the invention as specified in claim 20.

26. Regarding claim 21, Shykind discloses that the inspecting and said acquiring are performed substantially simultaneously since acquiring an image is part of an inspection process, thus, the processes are performed substantially at the same time (fig. 8).

27. Regarding claim 23, Shykind et al discloses inspecting is performed using non-aerial imaging reticle inspection system (fig. 2).

28. Regarding claim 24, Shykind et al discloses inspecting comprises a die-to-die comparison (fig. 8, item 806).

29. Claim 25 is rejected for the same reasons as claim 15. Thus, the arguments analogous to that presented above for claim 15 are equally applicable to claim 25. Claim 25 distinguishes from claim 15 only in that they have different dependencies and that claim 25's process window is based in transient defects. Since the dependencies both have been rejected and since the process window is based on finding all the defects including the transient defects, prior art applies.

30. Regarding claim 26, Phan et al discloses that non-transient defects comprise reticle manufacturing errors, since the hard errors are hard pattern defects, thus causing manufacturing errors on die that is to be printed with the reticle (col. 4, lines 24-28).

31. Claims 1, 3-7, 9, 10, 15, 18 and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shykind et al in view Ferguson et al, and further in view of U.S. Patent No 5046109 (Fujimori et al).

Regarding claim 1, Shykind et al discloses a method, comprising: acquiring images of a reticle (fig. 3) containing a design pattern by a detection circuit (fig. 2, item 204), wherein the images are acquired for different values of a member of a set of lithographic variables (fig. 8, item 300), the different values of a member of a set of lithographic variables being the different process conditions such as exposure time and focus setting; and determining a presence of an anomaly in the design pattern (fig. 8, item 808 and 810) by comparing at least one pair of the images corresponding to at least two of the different values (fig. 8, item 806).

Shykind et al does not disclose expressly that the images are aerial images. Shykind et al uses images of a printed die and that one of the different values represents a reference member value.

Ferguson et al discloses it is advantageous to take images of a mask by using aerial images (col. 7, lines 45-47) instead of using wafer exposures.

Shykind and Ferguson et al are combinable because they are from the same field of endeavor, i.e. imaging masks.

At the time of the invention, it would have been obvious to a person of ordinary skill in the art to use an aerial image.

The suggestion/motivation for doing so would have been to provide a faster, more accurate method (col. 7, lines 51-52).

Shykind et al (as modified by Ferguson et al) does not disclose expressly that one of the different values represents a reference member value.

Fujimori et al discloses the use of reference data, DR, the reference member value that is used to compare to another input data (col. 3, lines 52-65), which is paralleled to the other value of Shykind et al by use of comparison between two pieces of data.

Shykind et al (as modified by Ferguson et al) and Fujimori et al are combinable because they are from the same field of endeavor, i.e. defect detection in electronics.

At the time of the invention, it would have been obvious to a person of ordinary skill in the art to compare to a reference value.

The suggestion/motivation for doing so would have been to provide a basis of what is the ideal, thus finding defects more quickly, and to provide a more accurate defect detection by providing multiple means of detecting defects.

Therefore, it would have been obvious to combine the method of Shykind et al (as modified by Ferguson et al) with the reference data of Fujimori et al to obtain the invention as specified in claim 1.

32. Regarding claim 3, Shykind et al discloses the member comprises exposure (fig. 8, item 806).

33. Regarding claim 4, Shykind et al discloses a multi-die reticle (fig. 3).

34. Regarding claim 5, Shykind et al discloses that the anomaly comprises a design pattern defect since a defect is detected (fig. 8, item 810) that is part of the design

pattern since the defect is detected from a patterned die made from a patterning mechanism (col. 2, lines 24-26).

35. Regarding claim 6, Shykind et al discloses an anomaly that is detected comprises a reticle enhancement technique defect, since the reticle defects that are detected are enhanced in the technique described in col., 3, line 65- col. 4, line 19).

36. Regarding claim 7, Shykind et al discloses that the anomaly will print at the different values (fig 8, item 808), and that it will only print under a portion of the values because the defect will only print in the areas of the defect.

37. Regarding claim 9, Shykind et al discloses inspecting the reticle for other types of anomalies using one of the images, and also using the other in comparison (fig. 8, item 806), wherein the other types of anomalies comprise reticle manufacturing errors, wherein the reticle manufacturing errors are those errors that are sorted as a mask defects which would cause manufacturing errors, and contaminants, or the naturally occurring random defects that are different in the images (fig. 8, item 808) since this was not a cause of the reticle errors and thus does not repeat in the images. Ferguson et al discloses it is advantageous to take images of a mask by using aerial images (col. 7, lines 45-47).

38. Regarding claim 10, Shykind et al discloses that the inspecting comprises a die-to-die comparison (fig. 8, item 804 and 806).

39. Regarding claim 15, Shykind et al discloses determining a process window for a lithography process to be carried out using the reticle, the process window being the area of the process for each of the processing conditions (fig. 3).

40. Claim 18 is rejected for the same reasons as claim 1. Thus, the arguments analogous to that presented above for claim 1 are equally applicable to claim 18. Claim 18 distinguishes from claim 1 only in that they have different dependencies, both of which have been previously rejected. Therefore, prior art applies.

41. Regarding claim 19, Shykind et al discloses that the area comprises anomalies that are common to the at least one pair of the aerial images not acquired at the reference member value, or aerial images at random different exposure times (fig. 8, item 808) since the mask defects are the defects that are common in multiple dice and random defects are the defects that are different. Fujimori et al discloses that the area comprises anomalies that are not common to the aerial image acquired at the reference member value, since Fujimori et al finds the differences between the reference and the input in order to find anomalies (col. 4, lines 30-33).

42. Claim 22 is rejected under 35 U.S.C. 103(a) as being unpatentable over Shykind et al in view of Ferguson et al, Phan et al and Allan et al, as applied to claim 20 above, and further in view of Fujimori et al. Claim 22 is rejected for the same reasons as claim 2. Thus, the arguments analogous to that presented above for claim 2 are equally applicable to claim 22. Claim 22 distinguishes from claim 2 only in that they have different dependencies, both of which have been previously rejected by similar prior art. Therefore, prior art applies.

43. Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Shykind et al in view of Ferguson et al and Fujimori, as applied to claim 1 above, and further in view of U.S. Patent No 7133548 (Kenan et al).

Regarding claim 8, Shykind et al (as modified by Ferguson et al and Fujimori) discloses all of the claimed elements as set forth above and incorporated herein by reference.

Shykind et al (as modified by Ferguson et al and Fujimori) does not disclose expressly that the images are acquired with different detectors having the different values.

Kenan et al discloses having CCD cameras for an aerial imaging system (col. 7, lines 26-32. This is analogous to different detectors having the different values, since in a CCD camera there are many different CCD elements imaging the full object. Shykind et al's image of the full object contains the different values, as shown in fig. 3. Therefore, by using the imaging system of Kenan et al of using multiple CCD elements and cameras for each pixel with the imaging of Shykind et al, different elements/ detectors correspond to different values.

Shykind et al (as modified by Ferguson et al and Fujimori) and Kenan et al are combinable because they are from the same field of endeavor, i.e. defect detection in electronics.

At the time of the invention, it would have been obvious to a person of ordinary skill in the art to use multiple detectors.

The suggestion/motivation for doing so would have been to provide an accurate way of imaging the object, thus providing a more accurate recognition later on.

Therefore, it would have been obvious to combine the method of Shykind et al (as modified by Ferguson et al and Fujimori) with the multiple detectors of Kenan et al to obtain the invention as specified in claim 8.

44. Claim 11 is rejected under 35 U.S.C. 103(a) as being unpatentable over Shykind et al in view of Ferguson et al and Fujimori, as applied to claim 1 above, and further in view of U.S. Patent No. 5444480 (Sumita).

Regarding claim 11, Shykind et al discloses all of the claimed elements as set forth above and incorporated herein by reference. Ferguson et al discloses it is advantageous to take images of a mask by using aerial images (col. 7, lines 45-47) instead of using wafer exposures.

Shykind et al does not disclose expressly that prior to said determining, preprocessing the at least one pair of the images to remove relatively high intensity values and relatively low intensity values from the at least one pair of the images.

Sumita discloses removing dark and bright areas of the image in a preprocessing step (col. 5, lines 8-15).

Shykind et al and Sumita are combinable because they are from the same field of endeavor, i.e. image processing in inspection systems.

At the time of the invention, it would have been obvious to a person of ordinary skill in the art to remove the high and low intensities.

The suggestion/motivation for doing so would have been to provide a contrast-enhanced image by removing areas that are too dark and too bright.

Therefore, it would have been obvious to combine the method of Shykind et al (as modified by Ferguson et al and Fujimori) with the removal of dark and bright regions, as disclosed by Sumita to obtain the invention as specified in claim 11.

45. Claims 12 and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shykind et al in view of Ferguson et al and Fujimori, as applied to claim 1 above, and further in view of U.S. Patent Application Publication No. 20020181756 (Shibuya et al).

Regarding claim 12, Shykind et al (as modified by Ferguson et al and Fujimori) discloses all of the claimed elements as set forth above and incorporated herein by reference. Shykind et al further discloses identifying regions of the reticle based on a location of the anomaly by flagging the defects, thus marking where the defects are (fig. 8, item 810).

Shykind et al (as modified by Ferguson et al and Fujimori) does not disclose expressly that the flagged regions are reviewed.

Shibuya et al discloses that flagged regions are reviewed (pg. 7, pp 86).

Shykind et al (as modified by Ferguson et al and Fujimori) and Shibuya et al are combinable because they are from the same field of endeavor, i.e. defect detection.

At the time of the invention, it would have been obvious to a person of ordinary skill in the art to review flagged defect regions.

The suggestion/motivation for doing so would have been to provide a more accurate result by verifying that the defect exists and finding the type of defect.

Therefore, it would have been obvious to combine the method of Shykind et al (as modified by Ferguson et al and Fujimori) with the review of Shibuya et al to obtain the invention as specified in claim 12.

46. Regarding claim 13, review comprises image review at varying levels of optical conditions, or varying levels of optical locations since defects are in different locations (pg. 7, pp 86). Ferguson et al discloses it is advantageous to take images of a mask by using aerial images (col. 7, lines 45-47).

47. Claims 14, 16, 27 and 28 rejected under 35 U.S.C. 103(a) as being unpatentable over Shykind et al in view of Ferguson et al and Fujimori et al, as applied to claim 1 above, and further in view of U.S. Patent No. 6091846 (Lin et al).

Regarding claim 14, Shykind et al (as modified by Ferguson et al and Fujimori et al) discloses all of the claimed elements as set forth above and incorporated herein by reference. Shykind et al further discloses if there is more than one anomaly in the design pattern, the method further comprises binning the more than one anomaly by flagging the defect regions (fig. 8, item 810). This occurs if there is any amount of anomalies.

Shykind et al (as modified by Ferguson et al and Fujimori et al) does not disclose expressly that the regions proximate an anomaly is binned/ flagged.

Lin et al discloses the area surrounding a defect is stored (col. 20, lines 30-33).

Shykind et al (as modified by Ferguson et al and Fujimori et al) and Lin et al are combinable because they are from the same field of endeavor, i.e. defect detection.

At the time of the invention, it would have been obvious to a person of ordinary skill in the art to bin the area surrounding the defect.

The suggestion/motivation for doing so would have been to provide a more robust system by allowing for more information to be recorded for later evaluation.

Therefore, it would have been obvious to combine Shykind et al (as modified by Ferguson et al and Fujimori et al) with the areas surrounding the defect, as disclosed by Lin et al to obtain the invention as specified in claim 14.

48. Regarding claim 16, Lin et al discloses determining a critical status of the anomaly, by classifying the defect (fig. 19).

49. Claims 27 and 28 are rejected for the same reasons as claim 14. Thus, the arguments analogous to that presented above for claim 14 are equally applicable to claims 27 and 28. Claims 27 and 28 distinguishes from claim 27 only in that they reword "according to regions of the reticle proximate the...anomaly" to "by appearance of regions of the reticle immediately surrounding the defects" and "by patterns surrounding the defects" respectively. Lin et al teaches these features, since the anomaly area immediately surrounding the defect is stored, the appearance of the regions around the defect and the patterns around the defects are stored as well.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kathleen S. Yuan whose telephone number is (571)272-2902. The examiner can normally be reached on Monday to Thursdays, 9 AM to 5 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Bhavesh Mehta can be reached on (571)272-7453. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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